COGNITIVE PROCESSES

Agenda

- Language

Announcements

- Midterm grades will be posted today
- No class next Monday

Language

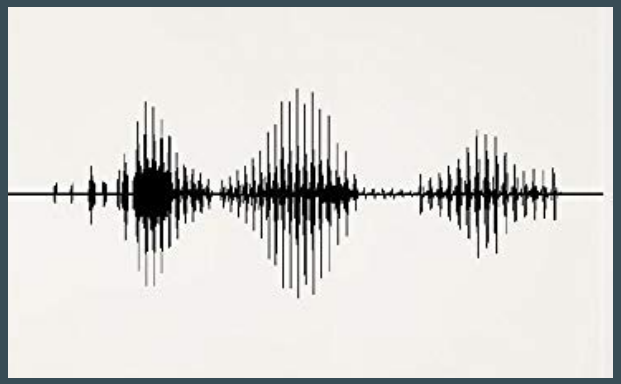
Language: a system of communication using sounds or symbols that enable us to express our feelings, thoughts, ideas, and experiences

Language

- 1) give you a high 5
- 2) hand you their phone
- 3) tell you who the president is

Language

- Language involves **sequences of signals**



sounds

LOVE

words

signs

Language

- Language creates **images**

  The Red Wheelbarrow

  so much depends
  upon

  a red wheel
  barrow

  glazed with rain
  water

  beside the white
  chickens

William Carlos Williams

Language

- Language is **meaningful**

CRAP PCRA

Language

- Language is **hierarchical** and **follows rules**
  - **Hierarchical nature of language:** consists of small components that can be combined to form larger units
  - **Rule-based nature of language:** components can be arranged in some ways, but not others

Language

- Language is **hierarchical** and **rules**

Language

- Language is **universal**

Structure of Language

Language = **Semantics** meaning of a word, sentence, or passage + **Syntax** rules that determine how words combine into sentences

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Red is my favorite color.

Color favorite is my red.

Sentence Comprehension

Phrasal semantics: meaning of sentences

Sentence Comprehension

Phrasal semantics: meaning of sentences

- **Sentences:** strings of words in a sequence
- **Parsing:** mentally grouping the words into phrases to create meaning

Sentence Comprehension

Phrasal semantics: meaning of sentences

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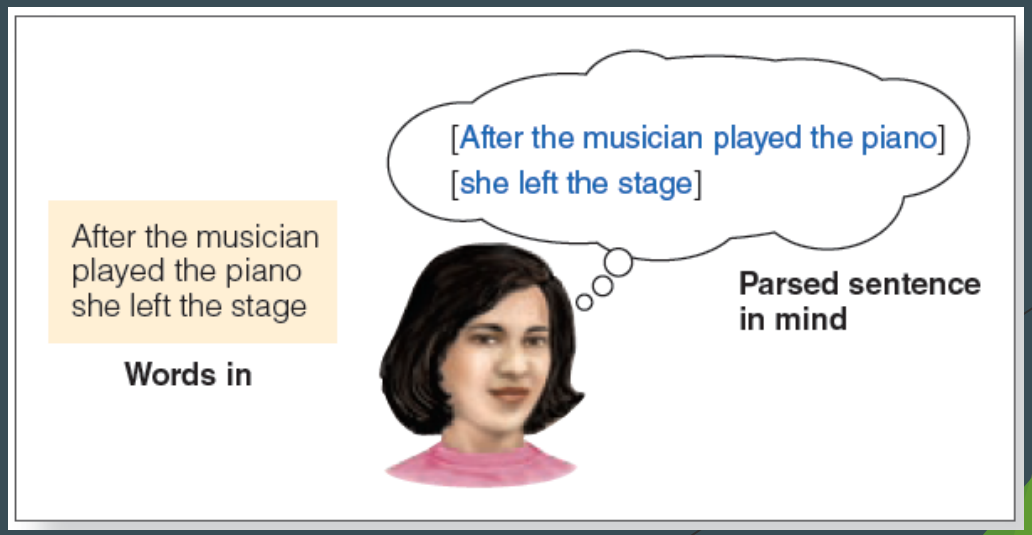
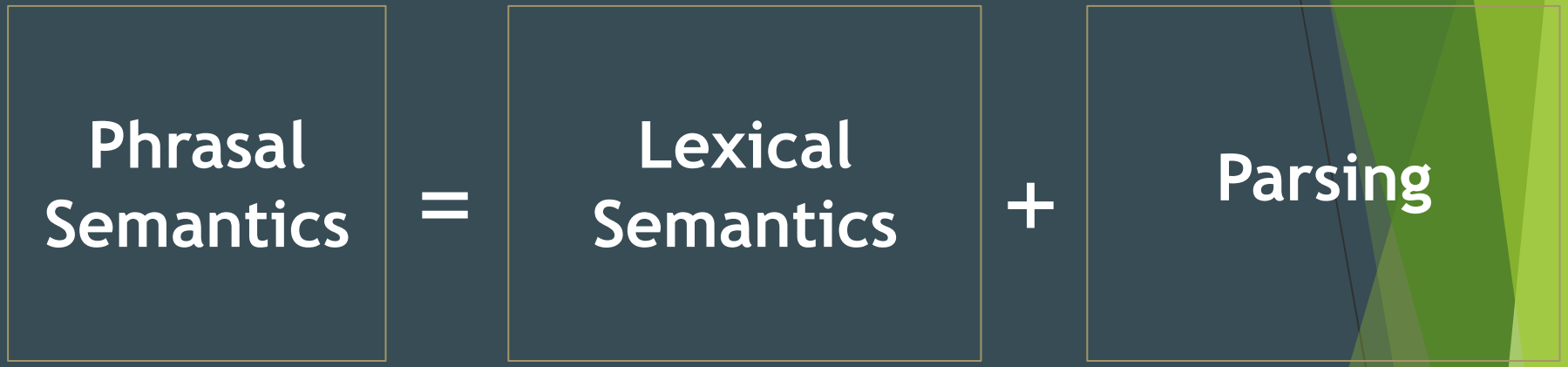


Sentence Comprehension



Sentence Comprehension

NEWSPAPER HEADLINES

"Squad helps dog bite victims."

"Iraqi head seeks arms."

"Local high school dropouts cut in half."

"Miners refuse to work after death."

"Kids make nutritious snacks."

Think, pair, share

How do you understand the following sentence?

“After the musician played the piano was wheeled off the stage”

Garden Path Model

"After the musician played the piano was wheeled off the stage"

assumed to be part of the same phrase

- **Late closure:** parser assumes each new word is part of the current phrase

Sentence Comprehension

Complete the sentence, “After the musician played the piano…”

a) …she left the stage
b) …she bowed to the audience
c) …the crowd cheered wildly
d) …was wheeled off the stage

Sentence Comprehension

Complete the sentence, “After the musician played the piano…”

a) …she left the stage

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- **Garden path sentences:** sentences that begin by appearing to mean one thing, but then end up meaning something else

Garden Path Model

Garden path model of parsing: listeners use heuristics (syntax-based rules) to group words into phrases

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- **Late closure:** parser assumes each new word is part of the current phrase

Constraint-Based Model

Constraint-based approach to parsing: listeners use syntax along with other information (word meaning, context, memory load) to group words into phrases

Constraint-Based Model

- **Word meaning** influences parsing

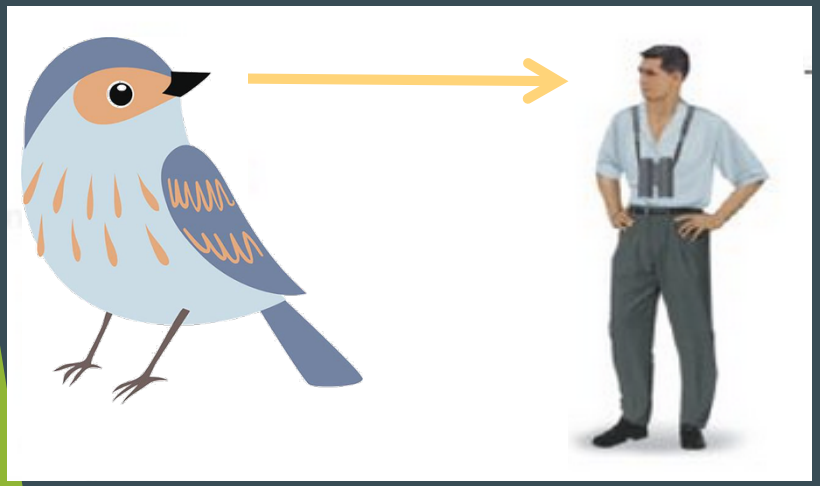
Constraint-Based Model

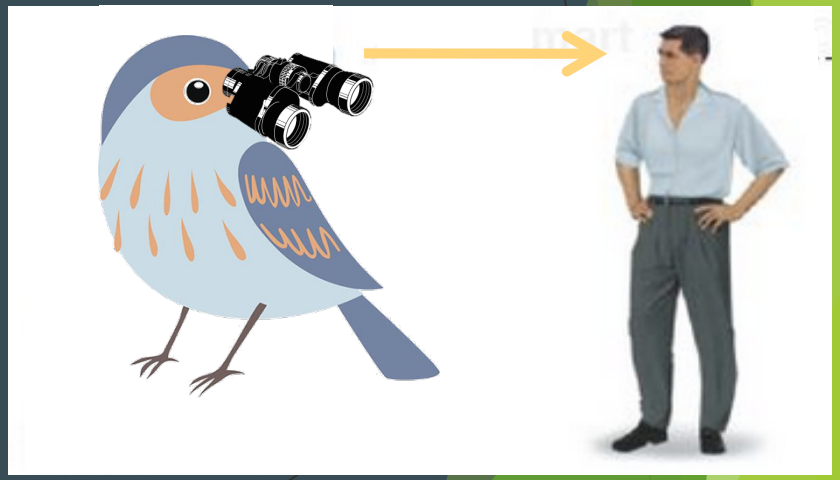
- **Word meaning** influences parsing

  The spy saw the man with the binoculars

Constraint-Based Model

- **Word meaning** influences parsing
  The BIRD saw the man with the binoculars





Constraint-Based Model

- **Story context** influences parsing

Constraint-Based Model

- **Story context** influences parsing

The horse raced past the barn fell.

Constraint-Based Model

- **Story context** influences parsing

There were two jockeys who decided to race their horses. One raced his horse along the path that went past the garden. The other raced his horse along the path that went past the barn. The horse raced past the barn fell.

Constraint-Based Model

- **Scene context** influences parsing

Constraint-Based Model

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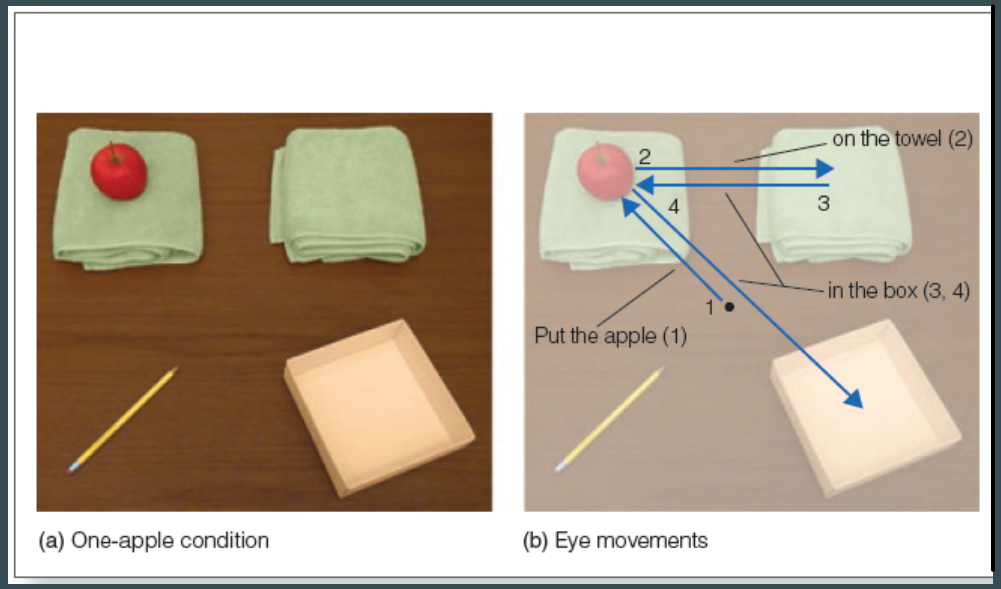
  "Place the apple on the towel in the box"



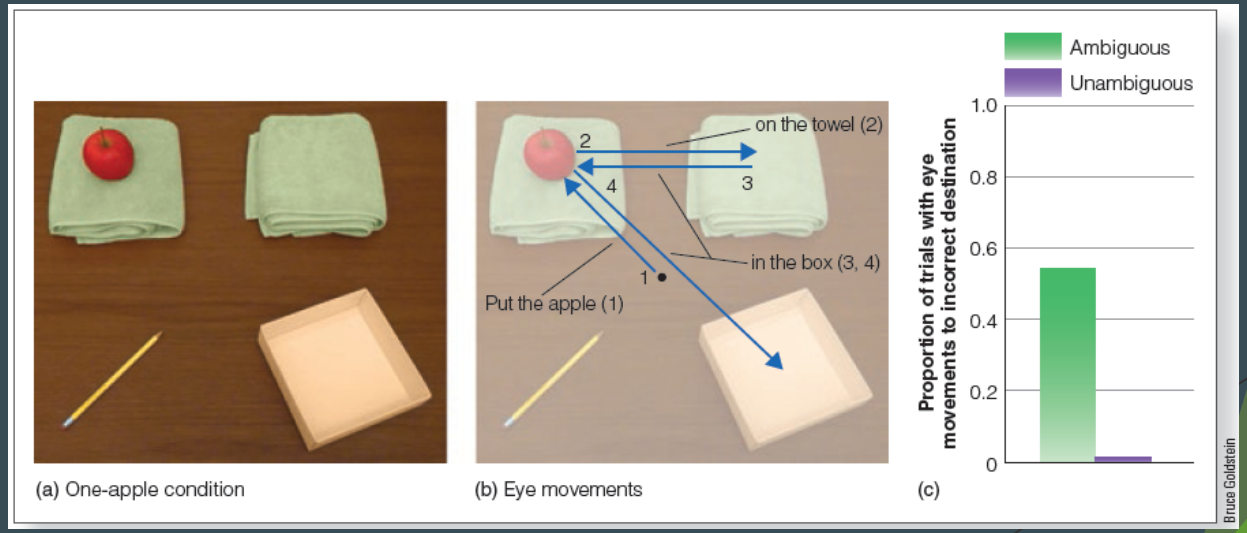
Visual world paradigm ***(one-apple scene)***

Constraint-Based Model

- **Scene context** influences parsing

"Place the apple that's on the towel in the box"

"Place the apple on the towel in the box"



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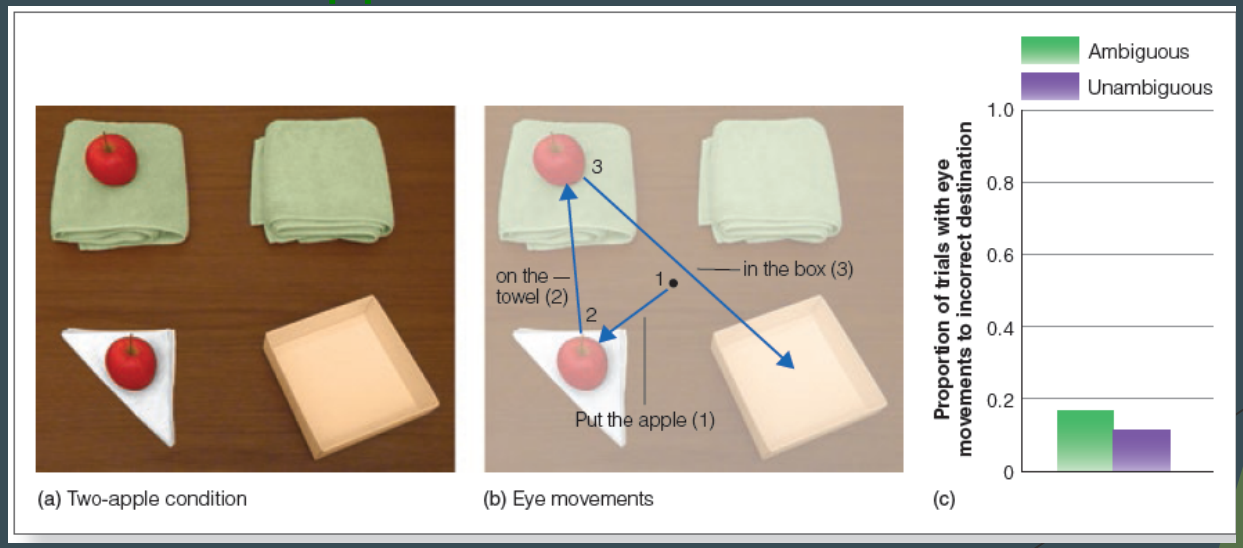

Visual world paradigm ***(two-apple scene)***

Constraint-Based Model

- **Memory load** influences parsing

Constraint-Based Model

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1) *The senator who spotted the reporter shouted*

2) *The senator who the reporter spotted shouted*

Constraint-Based Model

- **Memory load** influences parsing

1) *The senator who spotted the reporter shouted*

2) *The senator who the reporter spotted shouted*

the main clause is the same

Constraint-Based Model

- **Memory load** influences parsing

1) *The senator who spotted the reporter shouted*

Subject-relative construction: the senator is the subject of the embedded clause

2) *The senator who the reporter spotted shouted*

Object-relative construction: the senator is the object of the embedded clause

Constraint-Based Model

- **Memory load** influences parsing

parentese

grandparentese

Structure of Language

Hierarchical nature of language: consists of small components that can be combined to form larger units

Structure of Language

Phonemes:
smallest unit of speech sounds

Th uh b oh y l ah ee d

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Th | uh | b | oh | y | l | ah | ee | d

Morphemes:
smallest meaningful unit of language

The | boy | lie | -ed

Structure of Language

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Words

The | boy | lied

Structure of Language

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Morphemes:
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Words

The | boy | lied

Sentences

The boy lied

Psycholinguistic Approach

- **Comprehension:** How do we understand language?
- **Representation:** How is language represented in the mind?
- **Speech production:** How do we produce language?
- **Acquisition:** How do we learn language?

"No!" can be described as _____.

having two phonemes

a morpheme

a word

a sentence

all of the above are true

Learning Objectives

1. Define language and know its key features
2. Describe the elements of language and how they are structured
3. Explain how word comprehension is affected by word frequency and context

Word Comprehension

Lexical semantics: meaning of words

- **Lexicon:** all of the words we know
- **Semantics:** meaning of words, sentences, or passages

Word Comprehension

Lexical semantics: meaning of words

"Let's take a selfie!"

Word Comprehension

Lexical semantics: meaning of words

"Is he ghosting you?"

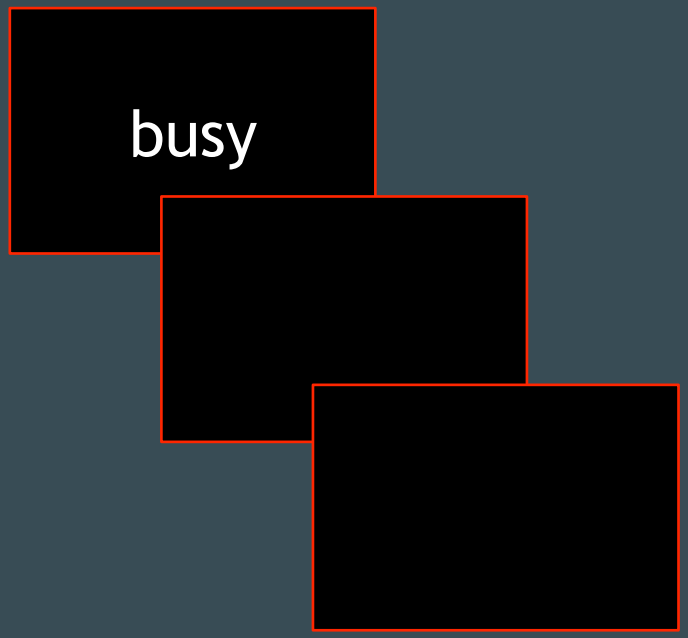
Word Frequency

THE	IT	THIS	OR	SO	WHEN	PERSON	THEN	BACK	EVEN
BE	FOR	BUT	AN	UP	MAKE	INTO	THAN	AFTER	NEW
TO	NOT	HIS	WILL	OUT	CAN	YEAR	NOW	USE	WANT
OF	ON	BY	MY	IF	LIKE	YOUR	LOOK	TWO	BECAUSE
AND	WITH	FROM	ONE	ABOUT	TIME	GOOD	ONLY	HOW	ANY
A	HE	THEY	ALL	WHO	NO	SOME	COME	OUR	THESE
IN	AS	WE	WOULD	GET	JUST	COULD	ITS	WORK	GIVE
THAT	YOU	SAY	THERE	WHICH	HIM	THEM	OVER	FIRST	DAY
HAVE	DO	HER	THEIR	GO	KNOW	SEE	THINK	WELL	MOST
I	AT	SHE	WHAT	ME	TAKE	OTHER	ALSO	WAY	US

- **Word frequency:** how often words occur

Word Frequency

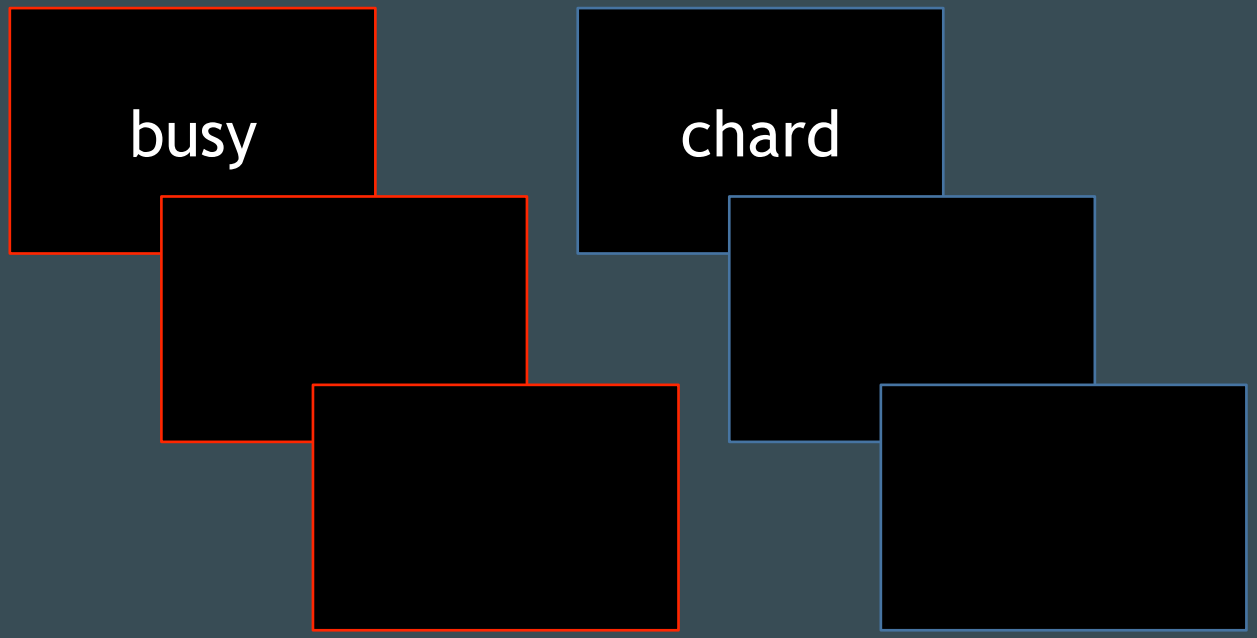
Is it a real word?



Lexical Decision Task

Word Frequency

Is it a real word?



Lexical Decision Task

Word Frequency

Is it a real word?

busy

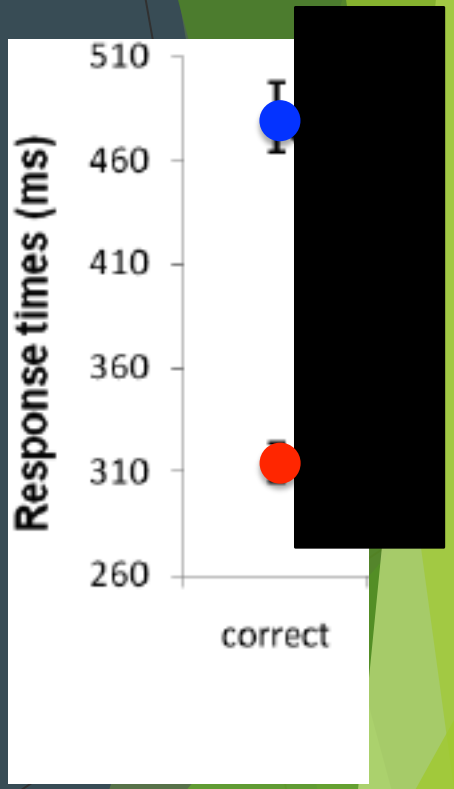
mulvow

history

chard

boovle

waltz

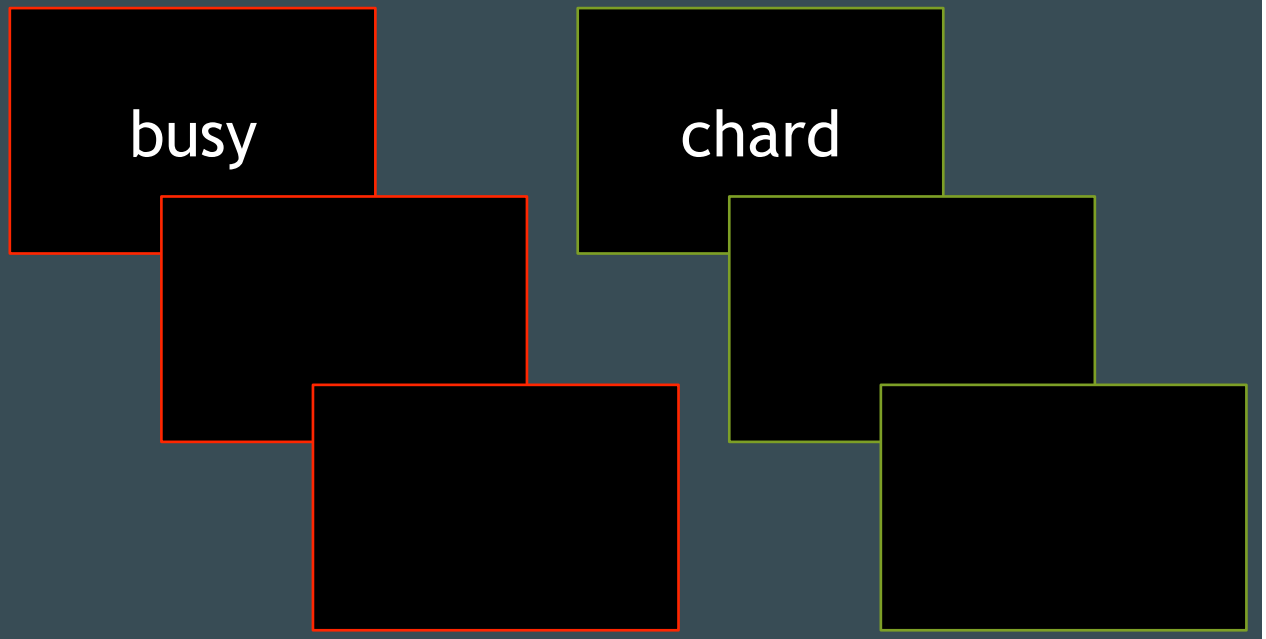


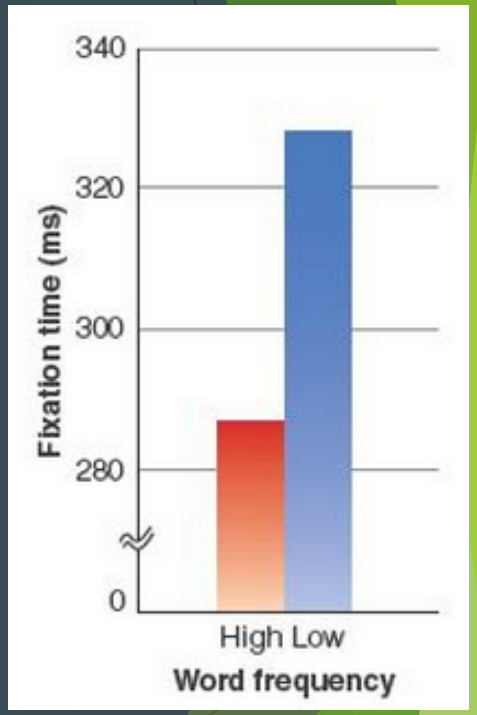
Lexical Decision Task

- **Word frequency effect:** we respond faster to words that occur more frequently

Word Frequency

Is it a real word?





Lexical Decision Task

- **Word frequency effect:** we fixate less to words that occur more frequently

Word Context

- **Word pronunciation:** how we say words is affected by speech speed, accents, and word “slurring”

Word Context

- **Word pronunciation:** how we say words is affected by speech speed, accents, and word "slurring"

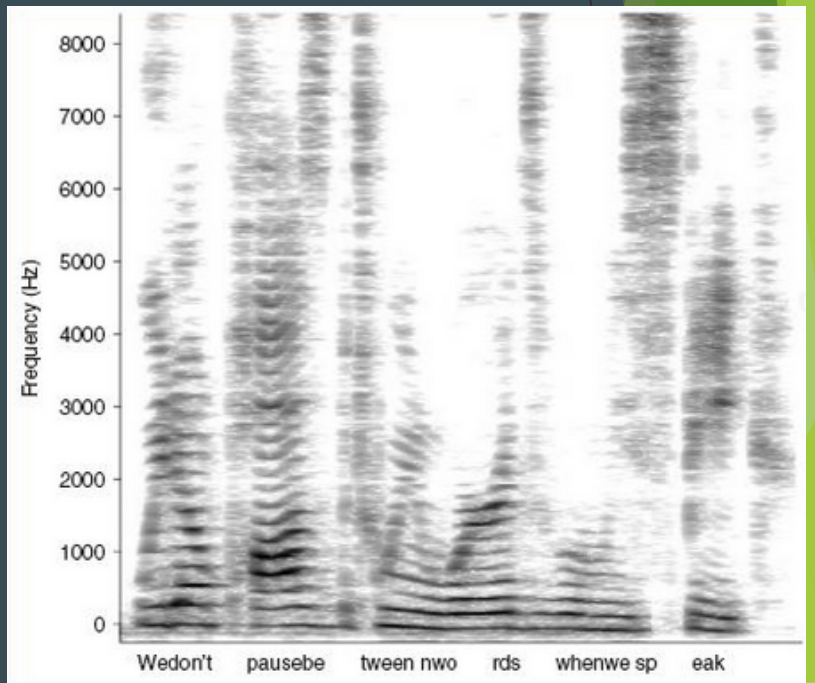
amana

juwana

dijoo

Word Context

- **Speech segmentation:** we perceive individual words even though there are often no silences between them

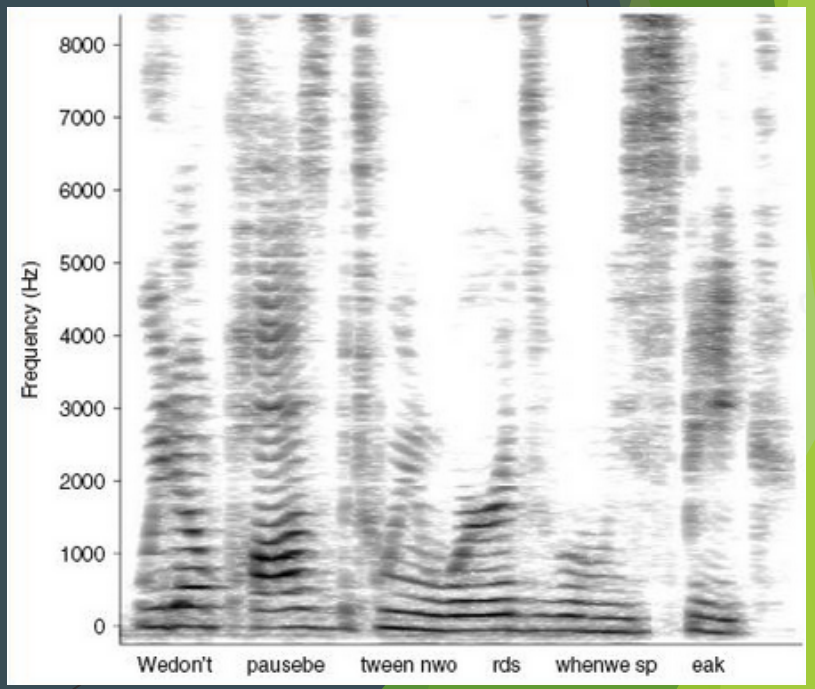


Word Context

- **Speech segmentation:** we perceive individual words even though there are often no silences between them

#didyouseethegamelastnight

#wonitatthebuzzer



Word Context

- **Speech segmentation:** we perceive individual words even though there are often no silences between them

When Carlos moved to the U.S., he did not understand any English:

"***Anna Mary Can Pi***"
"***I Scream Class Hick***"

Now that has been learning English, he recognizes the phrases:

"***An American Pie***"
"***Ice Cream Classic***"

Word Context

- **Speech segmentation:** we perceive individual words even though there are often no silences between them

“pre-ty-ba-by…
…hi-ba-by”

Word Context

- **Speech segmentation:** we perceive individual words even though there are often no silences between them

"Have you met my buddy big Earl?"

"Be a big girl and go talk to him!"

Word Context

HEAR: "excuse me while I kiss this guy"

NOT: "excuse me while I kiss the sky"

Three old guys are out walking.

First one says, "Windy, isn't it?"

Second one says, "No, it's Thursday!"

Third one says, "So am I. Let's go get a beer."

- **mondegreens:** mishear something

Word Context

- **Lexical ambiguity:** words often have more than one meaning

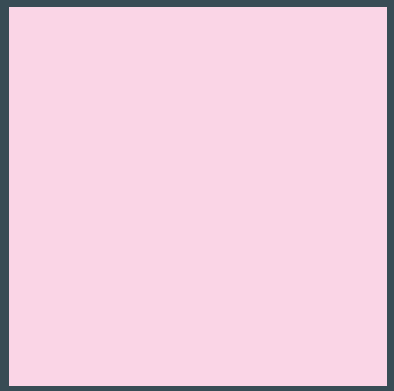
Word Context

- **Lexical ambiguity:** words often have more than one meaning

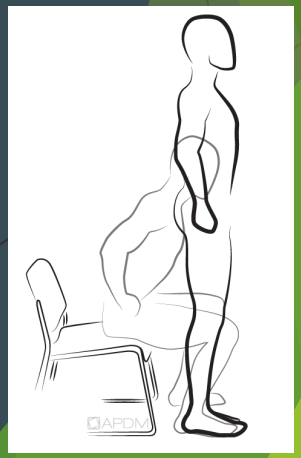
ROSE

thorny flower (noun)

warm pink color (noun)



past tense of stand (verb)



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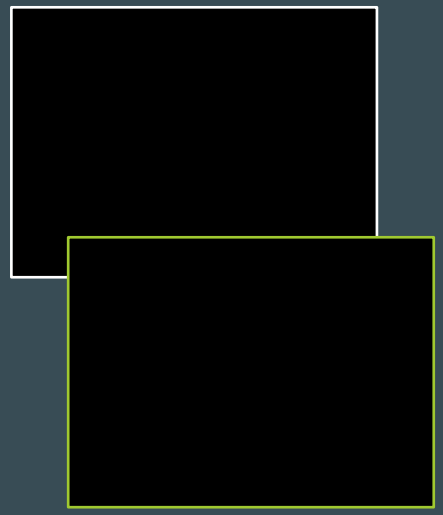
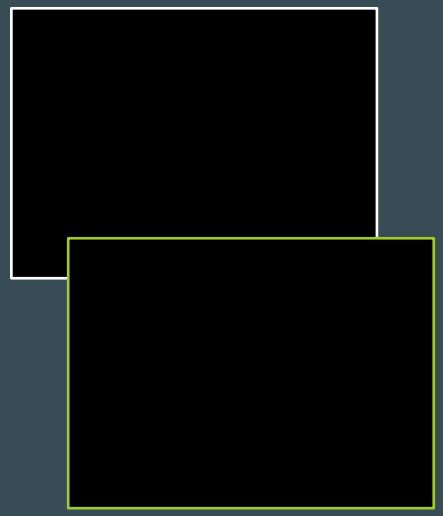


Lexical Priming Task

Word Context



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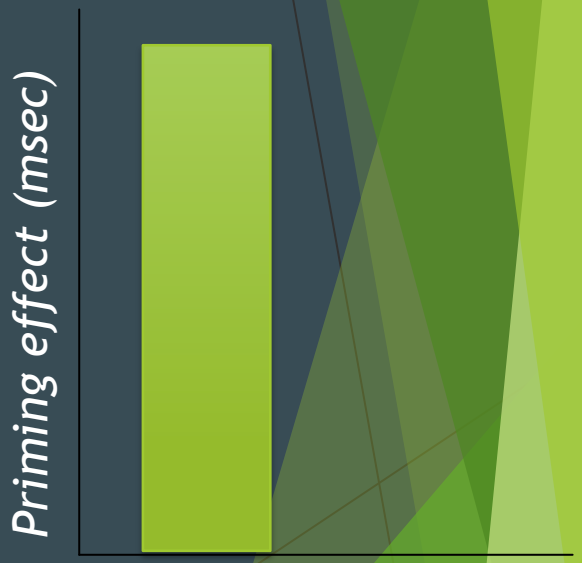

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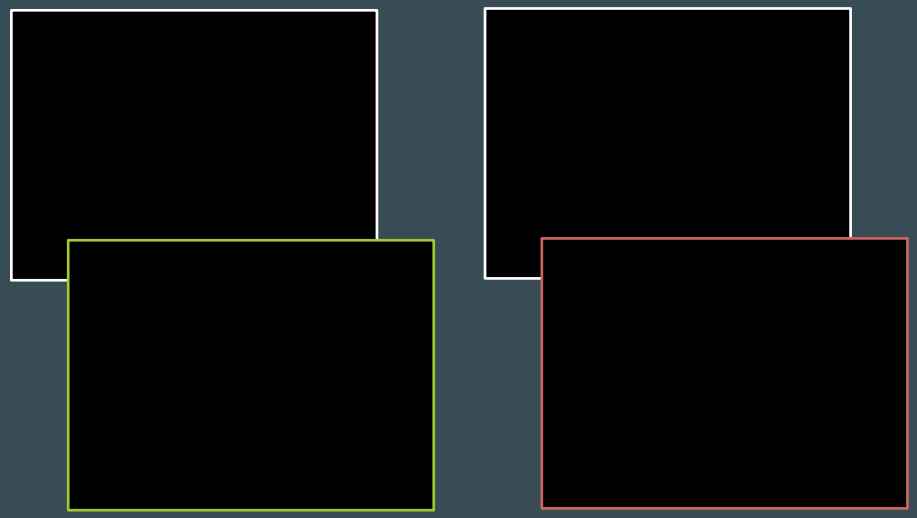

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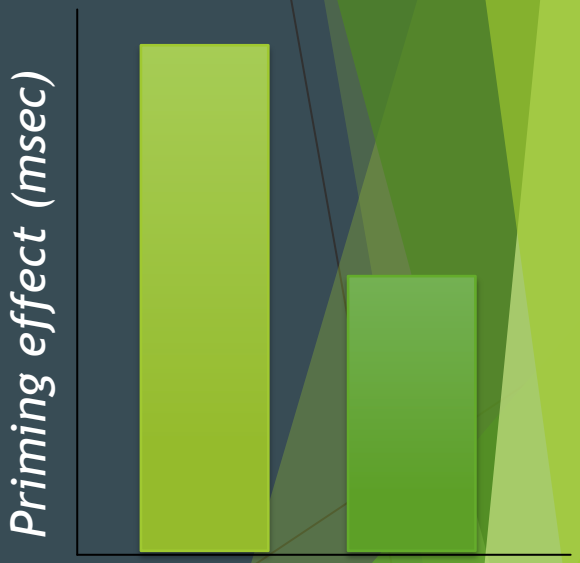
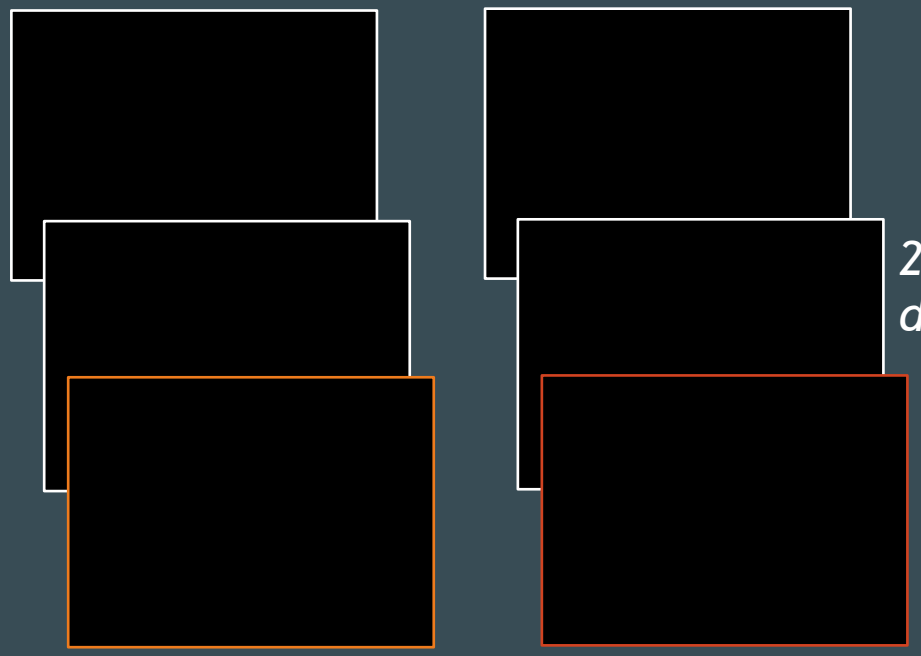


- all word meanings are briefly accessed

Word Context



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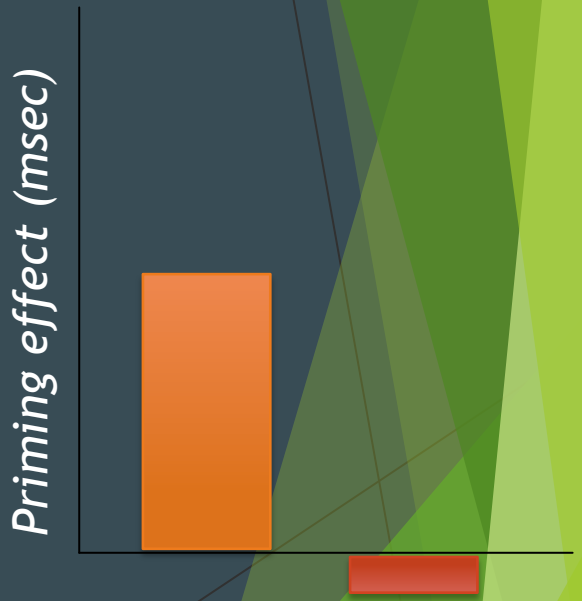

- all word meanings are briefly accessed before context is used to select the correct meaning

Word Context

- The old man the ships
- The fat people eat accumulates
- Cast iron sinks quickly rust

Word Context

- noun verb
  The old man the ships
- noun verb
  The fat people eat accumulates
- noun verb
  Cast iron sinks quickly rust

Word Context

- The old (noun) man the (verb) ships
- The (noun) fat people eat (verb) accumulates
- Cast (noun) iron sinks quickly rust (verb)

- **biased dominance:** one meaning occurs more often than others

Word Comprehension

- **Word frequency** influences
  - how quickly we process word meaning
- Sentences create **context** that helps us
  - identify words regardless of pronunciations
  - perceive individual words in continuous speech streams
  - determine the meaning of ambiguous words